Prepared Statement for the Senate Armed Services Committee Hearing On Military Transformation

*By Deputy Secretary of Defense Paul Wolfowitz, 216 Hart Senate Office Building, Washington, D.C. , Tuesday, April 9, 2002.*

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Introduction: The Imperative for Transformation

Mr. Chairman and Members of the Committee: You have provided our country great bipartisan support and strong leadership, and our relationship with the Committee and its staff has been truly outstanding. I appreciate the opportunity to return today to talk about how the Department of Defense plans to meet the challenges of the 21st Century through the transformation of our forces.

This Committee and the Congress have played a major role in transformation efforts in the past, including the role in several institutional changes of transformational character, such as the 1947 National Security Act, the 1973 All-volunteer Forces Act, and the 1986 Goldwater-Nichols Act. And Congress has sponsored and supported numerous transformational technologies, including stealth, cruise missiles and precision-guided munitions. As we undertake what may be the most significant transformation of our military forces in many decades, we hope to continue to work closely with the Congress to achieve our common national security objectives.

In the civilian economy today, we are witnessing a transformation in the manner, speed and effectiveness with which industrial and commercial tasks can be accomplished; these transformational efforts derive from the impact of advances in technology in computing, communicating and networking that, taken together, constitute an Information Revolution whose effects extend far beyond technology into the organization and even the culture of the business and commercial worlds.

This enormous rate of change can be explained in significant measure by a law known as Moore's Law, after Gordon Moore, co-founder of Intel, who first advanced the proposition that the power of computers will double every 18 months or so. Put more dramatically, that means that the power of computers increases by a factor of a thousand in a little more than a decade. But, the effect of this, as we know from daily life, extends far beyond just technological changes. Indeed, transformations that result from increased capability are due, in even greater measure, to innovative minds that take this technology and use it to transform everything—from how we work to how we navigate on the highways and how we ship packages around the world.

This transformational potential affects our military as well—in terms of both hardware and brainpower. In the current campaign, for example, young non-commissioned officers routinely integrate multiple intelligence collection platforms by simultaneously coordinating what amounts to several "chat rooms."

We have seen them creatively improvise with new military applications not unlike the technology they have grown up with. They display an agility that comes from being completely comfortable with this new way of doing things.

In the same way, the agility that we need to continue meeting threats here and abroad depends on more than just technology, although that must be a fundamental part of our response. It is tied to changing our organizational designs and embracing new concepts. Transformation is about more than what we buy or how much we spend on technology. One of my key points today is that transformation is about changing the military culture into one that encourages, in Secretary Rumsfeld words, "innovation and intelligent risk taking."

Twelve months ago, some might have questioned the continued investment in improving our advantage, in real and intellectual capital. Given the huge military lead we enjoy, some were even asking: who will fight us now? But, September 11th brought home the fact that, while it is likely few would seek to meet us head to head, they can still attack us. They can still threaten us. And when they did attack last September, using box cutters and jetliners, our response required much more than just box cutters and jetliners. Our response, as we seek to deny future terrorists avenues to similar attack, has been—and must be—disproportionately asymmetrical. And it does not come cheaply or without great effort at innovation.

My second key point is that, although we now face the enormous challenge of winning the global war on terrorism, we must also address the equally large challenge of preparing our forces for the future. We cannot wait for another Pearl Harbor or 9/11, either on the ground, in space or in cyberspace. Our ability either to deter or defeat aggression will continue to demand unparalleled capabilities—from technology to training and decision-making. That is why we must develop the transformational capabilities that will provide our crucial advantages a decade or more from now. Even as we take care of today, we must invest in tomorrow—an investment we simply cannot postpone. It is a process of balancing the risks of today with those of tomorrow, one that that should ultimately redefine how we go to war.

In the 1920s and 1930s, the French and British military establishments looked on the transformational issues of the time with a victor's sense that the next war would be fought like the last. But by the spring of 1940, with the Germans' lightning strikes across the Meuse and through the Ardennes, it was clear then that blitzkrieg—a term coined by Western journalists to describe this unmistakably new phenomenon—had redefined war and would shape battles for years to come.

We do not have to look back 60 years—or even twenty years—to find dramatic examples of military transformations. In Afghanistan today, brave Special Forces on the ground have taken 19th century horse cavalry, combined it with 50-year-old B-52 bombers, and, using modern satellite communications, have produced truly 21st century capability. When asked what he had in mind in introducing the horse cavalry back into modern war, Secretary Rumsfeld said, "it was all part of the transformation plan." And it is.

Transformation can mean using old things in new ways—a natural result of creative innovation.

These two examples suggest my final key point: our overall goal is to encourage a series of transformations that, in combination, can produce a revolutionary increase in our military capability and redefine how war is fought.

In the example from Afghanistan, we can see how dramatically our military has changed in just the 11 years since the Persian Gulf War. During that war, one of our biggest concerns was trying to destroy Scud missiles, the only Iraqi system whose capability we had underestimated. We flew hundreds of sorties and dropped thousands of pounds of bombs in the attempt to attack these elusive and fleeting targets that our pilots could not find from the air. Brave Special Operations Forces on the ground in western Iraq succeeded in finding Scuds, but did not have the capability to direct air strikes. In the end, as a result, we managed to take out only one Scud "launcher," and that one was a decoy. The successful operations in Afghanistan demonstrate how much progress has been made in the last decade, but that is only a glimpse of where we can go in the decades to come.

Transformation and QDR

Long before September 11th, the Department's senior leaders—civilian and military—began an unprecedented degree of debate and discussion about where America's military should go in the years ahead. Out of those intense debates, we agreed on the urgent need for real changes in our defense strategy. The outline of those changes is reflected in the Quadrennial Defense Review and the 2003 budget request.

Our conclusions have not gone unnoticed. One foreign observer reported that the QDR contains "the most profound implications" of the four major defense reviews since the end of the Cold War. What is most interesting about this analysis is its source: a Chinese military journal. That Chinese observer thinks the QDR is important as a outline for where we go from here—and we think so, too.

Among the new directions set in the QDR, the following four are among the most important:

First, we decided to move away from the two Major Theater War (MTW) force planning construct, which in its day was a major shift from the Cold War paradigm that planned for a global war focused on the defense of Europe from a massive Soviet invasion. The two MTW concept called for maintaining forces capable of nearly simultaneously marching on and occupying the capitals of two regional adversaries and changing their regimes. Today's new approach emphasizes deterrence in four critical theaters, backed by the ability to swiftly defeat two aggressors in the same timeframe, while preserving the option for one major offensive to occupy an aggressor's capital and replace the regime. By removing the requirement to maintain a second occupation force, we gain more

flexibility in planning for a wider array of contingencies, and we gain more flexibility in investing for the future.

Second, during the QDR the senior civilian and military leaders agreed on a new framework for assessing risk. We agreed that we couldn't simply judge the program on how it addressed near-term warfighting risks. A new framework was required, one that would get other risk up on the table as well. We identified four categories of risk: force management risks dealing with how we sustain our people, equipment, and infrastructure; operational risks dealing with the ability of our forces to accomplish the missions called for in near-term military plans; future challenges risks dealing with the investments and changes needed today to permit us to deal with military challenges of the more distant future; and institutional risks involved with inefficient processes and excessive support requirements that jeopardize our ability to use resources efficiently. The approach we adopted in light of this framework sought to balance risks in all of these categories, and avoid extreme solutions that would lower risks in some areas while raising other risks to unacceptable levels. While reasonable people may differ on specific decisions regarding our investments and budgetary decisions, it is important that we understand the need to balance among the different risks that we confront.

Third, to confront a world of surprise and uncertainty, we are shifting our planning from the "threat-based" model that has guided our thinking in the past to a "capabilities-based" model for the future. We don't know who may threaten us or when or where. But, we do have some sense of what sort of capabilities they may threaten us with and how. And we also have a sense of which capabilities can provide us important new advantages.

Fourth, to support this capabilities-based approach to force planning, we worked to define goals to focus our transformation efforts. Historically, successful cases of transformation have occurred in the face of compelling strategic and operational challenges. Therefore, we endeavored to determine what those challenges in the 21st century and the goals to address them might be.

Many Transformations to Revolutionize Warfare

The U.S. military is pursuing not a single transformation, but a host of transformations including precision, surveillance, networked communications, robotics and information processing. When these transformations come together, the resulting synergy could produce a revolutionary level of improvement in the ability of U.S. joint forces to dominate the battlespace. The convergence of military transformations within our land, air, sea, space and information forces could allow the development of new concepts of operations that will further exploit our ability to conduct military actions in a parallel rather than a sequential manner. We will be better able to overcome the enormous challenges posed by distance and geography. In short, transformations over the next several decades can give U.S. forces new asymmetric advantages while reducing many of our current vulnerabilities.

Six Transformational Goals—Taking Care of Today while Investing in Tomorrow

Setting specific transformation goals has helped to focus our transformation efforts, from investments to experimentation and concept development. The six goals identified in the QDR are:

First, to defend the U.S. homeland and other bases of operations, and defeat nuclear, biological and chemical weapons and their means of delivery;

Second, to deny enemies sanctuary—depriving them of the ability to run or hide—anytime, anywhere.

Third, to project and sustain forces in distant theaters in the face of access denial threats;

Fourth, to conduct effective operations in space;

Fifth, to conduct effective information operations; and,

Sixth, to leverage information technology to give our joint forces a common operational picture.

Protecting Critical Bases of Operations and Defeating NBC Weapons

Above all, U.S. forces must protect critical bases of operations and defeat weapons of mass destruction and their means of delivery. No base of operations is more important than the U.S. homeland. Defending the American homeland from external attack is the foremost responsibility of the U.S. Armed Forces. Vast oceans and good neighbors no longer insulate the United States from military attacks that emanate from abroad. The attacks of September 11 revealed the vulnerability of America's open society to terrorist attacks. Therefore, we must shore up our vulnerabilities to all forms of attacks.

Projecting and Sustaining Forces in Anti-Access Environments

Future adversaries are seeking capabilities to render ineffective much of the current U.S. military's ability to project military power overseas. Today, U.S. power projection depends heavily on access to large overseas bases, airfields, and ports. Saturation attacks by ballistic or cruise missiles armed with nuclear, biological, or chemical warheads could deny or disrupt U.S. entrance into a theater of operations. Advanced air defense systems could deny access to hostile airspace to all but low-observable aircraft. Military and commercial space capabilities, over-the-horizon radars, and low-observable unmanned aerial vehicles could give potential adversaries the means to conduct wide-area surveillance and track and target American forces.

New approaches for projecting power are needed to meet these threats. These approaches must place a premium on enhancing U.S. defenses against missiles and NBC weapons; conducting distributed operations; reducing the dependence of U.S. forces on major air and sea ports for insertion; increasing U.S. advantages in stealth, standoff, hypersonic and

unmanned systems for power projection; and developing ground forces that are lighter, more lethal, more versatile, more survivable, more sustainable, and rapidly deployable.

## Denying Enemies Sanctuary

Adversaries will also seek to exploit territorial depth and the use of mobile systems, urban terrain, and concealment to their advantage. Mobile ballistic missile systems can be launched from extended range, exacerbating the anti-access and area-denial challenges. Space denial capabilities, such as ground-based lasers, can be located deep within an adversary's territory. Accordingly, a key objective of transformation is to develop the means to deny sanctuary to potential adversaries—anywhere and anytime.

This will require the development and acquisition of robust capabilities to conduct persistent surveillance of vast geographic areas and long-range precision strike—persistent across time, space, and information domains and resistant to determined denial and deception efforts. The awesome combination of forces on the ground with long-range precision strike assets was amply demonstrated in Afghanistan. It offered a glimpse of the potential future that integration efforts can achieve if consciously exploited through U.S. transformation and experimentation efforts.

## Leveraging Information Technology

U.S. forces must leverage information technology and innovative network-centric concepts of operations to develop increasingly capable joint forces. Our ability to leverage the power of information and networks will be key to our success in the 21st century. New information and communications technologies hold promise for networking highly distributed joint and multinational forces and for ensuring that these forces have better situational awareness-about friendly forces and those of adversaries-than in the past. C4ISR systems draw combat power from the networking of a multitude of people using an array of platforms, weapons, sensors, and command and control entities, which are collectively self-organized through access to common views of the battlespace. Leveraging information technology and harnessing the power of networks poses three challenges: We must make information available on a network that people will be willing to depend on and trust. We must populate that network with new types of information needed to defeat future enemies and make existing information more readily available. And we must deny enemies' information advantages against us. The ultimate goal is to empower U.S. forces through the network, as Assistant Secretary of Defense John Stenbit has put it, "to move power to the edge." The edge doesn't just mean the guy in the foxhole -- it refers to anyone who urgently needs information anywhere on the network.

## Assuring Information Systems and Conducting Information Operations

Information systems must be protected from attack and new capabilities for effective information operations must be developed. The increasing dependence of advanced societies and military forces on information networks creates new vulnerabilities. Potential adversaries could exploit these vulnerabilities through their own computer

network attacks. Closely coordinating U.S. offensive and defensive capabilities and effective integration of both with intelligence activities will be critical to protecting the current U.S. information advantage.

## Enhancing Space Capabilities

The Department of Defense must enhance the capability and survivability of its space systems. Both friends and potential adversaries will become more dependent on space systems for communications, situational awareness, positioning, navigation, and timing. In addition to exploiting space for their own purposes, future adversaries will likely also seek to deny U.S. forces unimpeded access to and the ability to operate through and from space. A key objective for transformation, therefore, is not only to capitalize on the manifold advantages space offers the United States but also to close off U.S. space vulnerabilities that might otherwise provoke new forms of competition. U.S. forces must ensure space control and thereby guarantee U.S. freedom of action in space in time of conflict.

Taken together, these six goals will guide the U.S. military's transformation efforts and improvements in our joint forces. Over time, they will help to shift the balance of U.S. forces and capabilities. U.S. ground forces will be lighter, more lethal, and highly mobile; they will be capable of insertion far from traditional ports and air bases; and they will be networked to leverage the synergy that can come from ground forces and long-range precision fires from the air and sea. Naval and amphibious forces will be able to assure U.S. access even in area-denial environments, operate close to enemy shores, and project power deep inland. Air and space forces will be able to locate and track mobile targets over vast areas and strike them rapidly at long-ranges without warning. These future attributes are the promise of U.S. transformation efforts.

## Providing Capabilities to Meet the Transformational Goals

While new technologies represent only a portion of the Department's overall transformation program, transformational investments account for 17 percent (about $21 billion) of all procurement and RDT&E in 2003, rising to 22 percent by 2007. Over the next five years, we plan to invest more than $136 billion in transformational technologies and systems. Of this, $76 billion represents new investments to accelerate or start new transformation programs.

It is important to note that we have applied a very strict definition to programs we include in these totals as transformational (the system should offer the warfighter a distinctly new kind of capability). Many things that enable transformation, or extend current capabilities, are not included in these figures. For example, the $1.7 billion in this budget for funding for the Joint Direct Attack Munitions (JDAMs) and other precision guided munitions. This category also includes buying more C-17s to modernize our lift capability, and buying stealthy F-22s, and is, in fact, critical to making transformation work. The total additional investment in systems to support transformation approaches $25 billion in the FY03 budget and $144 billion over the FYDP.

Not included in either of these totals is the $10.5 billion that the budget invests in programs for combating terrorism, which is $5.1 billion more than we were investing in that area just two years ago and approximately $3 billion more than we have budgeted on missile defense in '03. That is due, in very great measure, to new priorities we must address in the wake of September 11th—needs that range from immediate necessities of hiring guards and building jersey barriers to long-term necessities like training first responders and refining our intelligence response to the on-going threat of terrorism.

There are many new transformation starts in this budget, many of which will not reach fruition within our programming horizon. Because they are new programs, there are limits to how much we can usefully invest in today. However, many R&D programs today, if successful, will place increased demands on procurement in the out-years. As transformation initiatives mature, we need to be prepared to make adjustments in the programs to take advantage of success. In doing so, however, we will constantly have to weigh the risks I referred to earlier between the need to be adequately prepared for future wars and the need to sustain the current force and to be adequately prepared for war tomorrow.

Let me highlight some of the capabilities we are investing in to meet the transformation goals:

Protecting Bases of Operations. To address the goal of protecting the homeland and other bases of operations, and defeating NBC weapons and their delivery means, we are pursuing advanced biological defenses and accelerating the development of missiles defenses. Missile defense investment includes increased funding for the Airborne Laser program, a directed energy weapons to destroy ballistic missiles in their boost-phase. The budget invests $8 billion in transformational capability to support defense of the U.S. homeland and forces abroad—$45.8 billion over the five year Future Years Defense Plan (2003-7), an increase of 47% from the previous FYDP.

Projecting Power in Denied Areas. To address the goal of projecting power into denied areas, we are developing new, shallow-draft fast transport ships to move forces into contested littoral areas more rapidly and less dependent on traditional ports. Similarly, we are developing the V-22 aircraft for inserting amphibious and special operations forces into denied areas. We are also developing unmanned underwater vehicles that can help to assure U.S. naval access in denied areas. Overall, the 2003 budget requests $7.4 billion for programs to support the goal of projecting power into denied areas, and $53 billion over the five year FYDP (2003-7)–an increase of 21%.

Denying Enemies Sanctuary. In the area of denying enemies sanctuary, we are developing a space-based radar system to provide a persistent, global ground surveillance and tracking capability. We are converting four SSBNs to carry more than 150 Tomahawk cruise missiles each and up to 66 SEALs.

We are also accelerating a number of unmanned vehicle programs. Unmanned surveillance and attack aircraft like Global Hawk and Predator offered a glimpse of their

potential in Afghanistan. The 2003 budget increases the number of unmanned aircraft being procured and accelerates the development of new unmanned combat aerial vehicles capable of striking targets in denied areas and sustaining persistent surveillance and strike capability over key targets. The budget includes $1 billion to increase the development and procurement of Global Hawk, Predator, and unmanned combat aerial vehicles.

DoD is also taking steps to shift the balance of its weapons inventory to emphasize precision weapons—weapons that are precise in time, space, and in their effects. We are developing a range of new precision and miniature munitions for attacking deep underground facilities, mobile targets, and targets in dense urban areas and for defeating chemical and biological weapons. We are also developing new families of ground-launched munitions, such as the GPS-guided Excaliber artillery round that will further the precision revolution in our ground forces. The 2003 budget requests $3.2 billion for transformational programs to support the objective of denying sanctuary to adversaries, and $16.9 billion over the five year FYDP (2003-7)–an increase of 157%.

Leveraging Information Technology. We are also leveraging information technology to create a single, integrated air picture. We have increased investment in datalinks and communications, such as Link-16, needed to transmit targeting information rapidly from sensors to shooters. And we are pursuing the development of laser communications in space that has the potential to provide fiber optics-quality broadband, secure communications anytime and anywhere U.S. forces may operate. This capability could have a revolutionary effect across many of our programs because bandwidth limitations are one of the key constraints on our ability to exploit unmanned systems, networked information systems, and new surveillance capabilities. Laser communications is a good example of the synergistic effects that capabilities in one area can have on others. The 2003 budget requests $2.5 billion for programs to support the objective of leveraging information technology, and $18.6 billion over the five year FYDP (2003-7)–an increase of 125%.

Conducting Effective Space and Information Operations. Finally, we are increasing investments also in information and space operations. Many of these are highly classified programs. The 2003 budget requests $174 million for programs related to information operations--$773 million over the five-year FYDP (2003-7)–an increase of 28%. The 2003 budget requests about $200 million to strengthen space capabilities--$1.5 billion over the five-year FYDP (2003-7)–an increase of 145%.

We couldn’t have made these investments without terminating a number of programs and finding other savings. Although this year’s defense budget increase is the largest in a long time, virtually the entire increase was "spoken for" by needed increases to cover inflation ($6.7 billion), "must-pay" bills for health care and pay raises ($14.1 billion), unrealistic costing of readiness and procurement ($7.4 billion), and funding the war ($19.4 billion). We have saved some $9.3 billion by terminating a number of programs. Major terminations include the DD-21 Destroyer program, which has been replaced by a restructured DD (X) program that will develop a new family of surface combatants with revolutionary improvements in stealth, propulsion, and manning levels. We have cut 18

Army legacy systems. Although the Navy Area Missile Defense program was terminated because of delays, poor performance and cost growth, we are still looking to develop sea-based defenses under a replacement program.

It is important to point out that in the area of missile defense, we are pursuing some parallel technologies to meet the same objectives—for example, the kinetic kill boost vehicle and a space-based laser. At this point, we are not certain which of these programs will work best. But, we think that pursuing both will help us reach our goal faster—success in one will inform the other. As we continue, however, it is very likely that one of these programs will not survive. As with the Navy Area Missile Defense program, when it becomes clear we have reached a dead end, we must be willing to cut a program, take what we have gained, and redirect our energy and efforts in more potentially productive directions. This sort of intelligent risk taking, which can sometimes produce dead-ends, is a necessary part of transformation.

Transformation: Beyond Platforms and Systems—Changing the Culture

As we have seen in Afghanistan, transformation is more than a simple introduction of new technology. Although the Germans were the first to make tanks a decisive instrument of war, they did not invent the tank; nor were they the first to use the tank in combat, or in figuring out that tanks could prove decisive in warfare. What they did do first was use it to devastating effect through: the combination of armor with air and radio communications; the willingness to risk employing a new and bold doctrine; allowing armor to emerge in an army traditionally dominated by infantry; delegating responsibility to lower levels so that units could operate with the autonomy that armor and radio communications could give them. The success of blitzkrieg went beyond technology. It even went beyond doctrine, beyond speed, beyond communications. It was when all these elements came together that blitzkrieg was born. It was a culture change from top to bottom.

We may draw other transformation lessons from changes in culture. The introduction of the all-volunteer force was certainly transformational. Throughout the Cold War, one measurement of the military balance was through end-strength comparisons between Warsaw Pact and NATO forces. After Vietnam, the U.S. moved away from conscription. This bold move meant a smaller force, but a force that was better trained, better prepared, and more highly motivated. The end result is a peerless cadre of officers and NCOs who are dedicated to serving our nation.

Another transformational development is in our unparalleled ability to conduct night operations. Particularly given our experiences in Vietnam, we knew we had to fundamentally reduce our vulnerabilities in this area. So, we acquired technology such as night vision goggles, that allow us to virtually turn night into day. We conduct extensive night training operations. And we have turned a vulnerability into an advantage. Today, it is not hyperbole to say we "own the night. "

The campaign in Afghanistan has planted the seeds of culture changes in other areas that will prove to be as significant, I think. Historically, Special Operations Forces have operated separately from conventional forces. But, this campaign necessitated their close integration with conventional forces, especially air forces. One of the results, of course, is the order of magnitude change in how precise we are in finding and hitting targets from just a decade ago. This is not only changing the culture of Special Operations Forces, but it is changing how the rest of the force thinks about Special Operations as well.

What it means to be a pilot today is undergoing a transformation as well. Not long ago, an Air Force F-15 pilot had to be persuaded to forego a rated pilot's job to fly an unmanned Predator aircraft from a location far from the field of battle. It was a difficult choice for this woman who was trained in the traditional cockpit. But, she received assurance from the most senior leadership of the Air Force that her career would not suffer as a result. Of course, UAVs have made a significant impact in the current campaign and promise even greater operational impacts—which is why the Air Force leadership is working hard to encourage others to pilot UAVs and become trailblazers in defining new concepts of operations.

Accelerating cultural change and fostering innovation. Some of the greatest military transformations in the 20th Century were the product of American innovation—the development of amphibious warfare, aircraft carriers, stealth and nuclear-powered submarines, to name a few. Great names like Billy Mitchell and Hyman Rickover are associated with such developments, and it is no secret that the unconventional ways of some of these innovators were sometimes difficult for their large organizations to adjust to. But, less iconoclastic officers also had difficulties when they clashed with perceived wisdom.

In the period between the Wars, one infantry officer began writing about the future of armored warfare, only to have his commander tell him that if he published anything contrary to "solid infantry doctrine," it would mean court-martial. The commander even tried to scuttle the officer's career. It took the intervention of Pershing's chief of staff to put the soldier's career on a new path. That officer, so interested in the future of armored warfare, was Dwight Eisenhower.

One of our fundamental goals is to encourage all the potential Eisenhowers who are thinking about war of the future. Instead of stifling those who seek to look forward so we can lean forward when necessary, we must encourage and reward them. We intend to accelerate the development of a culture that supports the sort of innovation, flexibility and vision that can truly transform the face of battle.

From my observations, the Armed Forces today are much more congenial toward innovation and innovators. Certainly the way in which the Commander of Central Command, General Tommy Franks, has experimented in Afghanistan demonstrates an openness to change—an openness that is helping us win the war and transform the military. But, it will always be a challenge for a large institution like the Defense Department to encourage innovation while, at the same time, allowing the organization to

continue getting its job done. And we have to work constantly to encourage that creative tension.

Another way we can support the acceleration of a more innovative culture is through the processes of experimentation and training. In an environment where real intellectual R&D takes place, intelligent risks don't produce failure. They produce insights and lessons. Taking risks is all part of a discovery process, captured by the Rumsfeld Rule that states: "When you're skiing, if you're not falling you're not trying."

Experimentation and Concept Development

One of the best arenas for encouraging our forces to try hard, lean forward and risk failure is through field exercises. Over the last century, military field exercises and experiments that were oriented toward emerging challenges at the operational level of war have been important enablers of military innovation and transformation.

Field exercises that incorporate experimentation—at both the joint and the service levels—provide an indispensable means for tackling emerging challenges. In the period between the wars, Marine Major Pete Ellis perceived that war in the Pacific was likely to come, and he proposed a landing concept that we now call amphibious warfare. The Marine Corps saw that the realization of this doctrine would require special training and special equipment. Over time, and through repeated exercises, the Marines perceived the need for three different types of landing craft: one for the first troop assault; a second for the second larger troop landing; and a third to put tanks ashore. Taking Ellis's idea from the drawing board to practice beaches resulted in success in the sands of Iwo Jima, Okinawa and others.

The ability of modern communications to integrate widely disparate forces puts a much greater premium on joint operations than we have already recognized with Goldwater-Nichols and the many innovations that flowed from it. Along with experimentation, the development of joint operational concepts and operational architectures will drive material and non-material transformation solutions and establish standards for interoperability, in much the same way that amphibious warfare was perfected. New operational concepts—the end-to-end stream of activities that define how force elements, systems, organizations, and tactics combine to accomplish military tasks—are critical to the transformation process. They may even reveal how we can accomplish our aims with fewer people and resources.

General Kernan can address in more detail how Joint Forces Command is developing a joint experimentation plan that uses wargames, synthetic environment experiments, and field experiments to develop and evaluate joint concepts. This summer, JFCOM will conduct Millennium Challenge, an exercise that seeks to exploit our asymmetric advantages through joint operations.

Training

Secretary Rumsfeld has said that, if you were to give a knight in **King Arthur's** court an **M-16, and he** uses the stock to knock his opponent's head, that is not transformational. Rather, transformation occurs when the knight gets behind a tree and starts shooting. But, just because he starts shooting, that doesn't make him a marksman—only training can do that.

Likewise, training must go hand in hand with the fielding of new concepts and capabilities. We must train as we will fight. We must train as we will fight. And today, we will always fight with combinations of mission-oriented joint forces—selected from our services and those of our allies. We must therefore emphasize a culture that stresses joint sharing of information, concepts and awareness to ensure our troops can fight on day one of the battle with experience and confidence. At the conclusion of Desert Storm, when I visited the 2nd Armored Division inside Iraq with then-Defense Secretary Cheney, the Secretary asked a very tough Senior Master Sergeant whether the war had been difficult. The sergeant answered: "not nearly as tough as the National Training Center."

Recognizing how important such training has been to our operations, a centerpiece of our training transformation effort will be the Joint National Training Center, which will include a live training component connecting multiple live training exercises and allowing "best of" practices to circulate among the services. It will also include a virtual capability that will link main service training centers. Over time, we want to increase the amount of joint field training that our forces receive as well. Ultimately, these practices will encourage all the services to fight jointly because they have trained jointly.

Organizational Re-Design

We have seen the need in our transformation efforts to re-design some of our military organizations to harness the tremendous power of new technologies and exploit the synergy of joint forces. In the early 1900s, the head of the Royal Navy, Admiral Jackie Fisher, recognized a similar need. He understood that the British Navy was no longer arrayed for war as it was likely to unfold in the coming century. He initiated a dramatic re-conceptualization of the Navy's organization, its missions and how it would carry out its tasks. His visionary strategy included both weapons and doctrines that would come on line over a period of time. His vision helped produce a revolutionary new battleship as well as an organizational structure more suited to the world as it was then.

In the same way, DoD is taking steps to realign its organizations to better integrate and deploy combat organizations that can respond rapidly to events that occur with little or no warning—the type of environment that characterizes our world today. Joint forces must be scalable and organized into modular units that allow combatant commanders to combine the appropriate forces to deter or defeat a specific adversary. They must be organized to enhance the speed of deployment, speed of employment and the speed of sustainment. The forces must be highly networked with joint and multinational command and control, and they must be able to integrate into multinational operations.

To strengthen joint operations, the Department is developing options to establish Standing Joint Task Force (SJTF) headquarters in each of the regional combatant commands. Each headquarters will be established under uniform, standard operating procedures, tactics, techniques, and technical system requirements, thereby permitting the movement of expertise among commands. Each SJTF headquarters will have the means to develop a common relevant operational picture of the battlespace for joint and multinational forces. It will also have mechanisms for a responsive integrated logistics system that provide warfighters easy access to necessary support without burdensome lift and infrastructure requirements. SJTF headquarters will also use adaptive mission planning tools that allow U.S. forces to operate within the adversary's decision cycle and respond to changing battlespace conditions.

Related to the development of such headquarters, the Department is also examining options for establishing actual Standing Joint Task Forces (SJTFs). SJTF organizations could provide the organizational means to achieve a networked capability. They would employ new concepts to exploit U.S. asymmetric military advantages and joint force synergies at lower total personnel levels. A single Standing Joint Task Force could serve as the vanguard for the future transformed military. It could undertake experiments as new technologies become available as well as offer immediate operational benefits.

Professional Military Education

We also need to ensure that the classroom education our senior military leaders receive includes military transformation. As these leaders go on to assume greater and greater responsibilities for military operations, personnel, acquisition and administration, it is vital that they appreciate the importance of transforming the military and that we instill in them a spirit that not only tolerates, but nurtures innovative thinking and encourages risk-taking and failure in the pursuit of new ideas and capabilities. We want to inculcate in them an entrepreneurial spirit and an understanding of how militaries have been transformed historically, as well as an awareness of how private companies have transformed themselves in the face of discontinuous change.

Conclusion

Even as we fight this war on terror, potential adversaries scrutinize our methods, they study our capabilities, they seek our weaknesses. They plan for how they might take advantage of what they perceive as our vulnerabilities. So, as we take care of today, we are investing in tomorrow. We are emphasizing multiple transformations that, combined, will fundamentally change warfare, in ways that could give us important advantages that can help us secure the peace. We realize that achieving this goal requires transforming our culture and the way we think. We must do this even as we fight this difficult war on terrorism. We cannot afford to wait.